Remarks

The Applicants have amended Claim 10 with respect to the nickel coated copper foil. Thus, Claim 10 now recites that the diverters consist of copper foil coated with nickel on both foil surfaces in layer thickness of 10 nm to 3 μm. This amendment is made to clarify that the copper foil has a nickel layer coating on both the upper and lower surfaces to better achieve weldability and corrosion resistance. Support may be found throughout the Applicants' Specification such as in paragraphs 17-20. Entry into the official file is respectfully requested.

The Applicants have also added new Claim 20. New Claim 20 is based on previous Claim 10 and includes the same changes with respect to the copper foil coated with nickel on both foil surfaces. New Claim 20 further recites that the voltaic element comprises a plurality of lithium intercalating electrodes, a collector connected to each electrode, housing comprising flexible film material enclosing the electrodes and collectors, and diverters connected to collectors associated with positive and negative electrodes of the element. Claim 20 also recites that the collectors associated with the negative electrodes consist of copper and only collectors consisting of copper connect to the at least one diverter consisting of copper foil coated with nickel on both surfaces thereof. Support may be found throughout the Applicants' Specification such as in paragraphs 5, 12, 17-20, the Abstract and Fig. 1. Entry of new Claim 20 into the official file and consideration on the merits is respectfully requested.

The Applicants note with appreciation the withdrawal of the previous rejection based on the hypothetical combination of Hirai with Takahashi.

Claims 10-17 and 19 now stand rejected over the hypothetical combination of Hirai and Natatsugawa with Takahashi. The Applicants note with appreciation the Examiner's detailed comments hypothetically applying the combination against those claims. However, the Applicants

respectfully submit that one skilled in the art would not make the hypothetical combination, but in any event, the combination would lead to completely different voltaic elements.

The rejection states that Takahashi does not explicitly teach the coating of copper foils used as diverters with nickel. The Applicants agree. Thus, the rejection turns to Hirai and Nakatsugawa to cure those deficiencies. Hirai is said to disclose nickel-plated copper and Nakatsugawa is said to disclose electroplating 0.2 μm nickel coating on copper foil. The conclusion is that it would thus be obvious to utilize the nickel-plated copper of Hirai and Nakatsugawa in the batteries of Takahashi. The Applicants respectfully submit, however, that there are problems associated with that combination.

Turning first to Hirai, the Applicants respectfully submit that one skilled in the art would not combine Hirai with Takahashi. In particular, the Applicants respectfully submit that Hirai leads those skilled in the art away from the combination as recited in the rejection. In that regard, Hirai discloses that aluminum, copper (including nickel-plated copper) on nickel are not suitable as materials for terminals of lithium-ion batteries since those materials may be corroded by hydrogen fluoride produced from the reaction between the electrolyte of the battery and water.

The Applicants invite the Examiner's attention to paragraph 11 of Hirai which specifically states that "the tabbed surfaces may be corroded by hydrogen fluoride produced from a reaction between the electrolyte of the battery and water at a portion of the terminal made of the copper member." Then, Hirai teaches in paragraph [0034] that using copper materials and aluminum is problematic. Thus, the terminals disclosed in paragraph [0033] are potentially subject to corrosion, irrespective of whether it is the disclosed aluminum, copper, nickel-plated copper or nickel.

Hirai thus suggests a solution which is recited in paragraph [0041] in particular wherein a composite covering layer is provided over the terminals disclosed in paragraph [0033]. This

composite covering is a reaction product of an aminated phenol polymer, a trivalent chromium compound and a phosphorus compound. The result is that the metallic terminals of paragraph [033] are coated with the composite covering layer.

What do the teachings of Hirai mean? First, the Applicants respectively submit that Hirai would lead one skilled in the art away from utilizing terminals as disclosed in paragraph [0033] such as aluminum, copper, nickel-plated copper or nickel because they are subject to corrosion. Thus, one skilled in the art would not look to hypothetically combine those terminals from Hirai with the batteries of Takahashi with a reasonable expectation of success. In fact, one skilled in the art would have a reasonable expectation of problems because of the acknowledged belief in corrosion issues associated with the Hirai terminals.

Hirai also suggests that even if one skilled in the art were to hypothetically combine the teachings of Hirai with Takahashi, the result would be a terminal such as that disclosed in paragraph [0033] having a covering layer of the composite of paragraph [0041]. However, that structure would be completely different from that recited in Claim 10 which recites that the diverters consist of copper foil coated with nickel on both foil surfaces in light of thicknesses of 10 nm to 3 μm. The Applicants' use of the term "consists of" excludes the composite material, which is the solution provided by Hirai. However, the Applicants preclude the use of that composite covering layer and, instead, provide diverters consisting of copper coated foil with nickel on both foil surfaces. Thus, the combination would fail to result in the subject matter as recited in Claims 10-17 and 19. The Applicants therefore respectfully submit that the portion of the rejection wherein Hirai is combined with Takahashi is inapplicable. Withdrawal of that portion of the rejection is respectfully requested.

The Applicants respectfully submit that the portion of the rejection wherein Nakatsugawa is applied to Claim 10 is also in error. Nakatsugawa is not concerned with corrosion problems

resulting from hydrogen fluoride present in the electrolyte of batteries as in Hirai. However, Nakatsugawa highlights the corrosion problems associated with the incompatibility of copper foil material with resin layers of laminated boards of printed circuits. This is discussed at length in column 1, lines 23-41 of Nakatsugawa.

The solution provided by Nakatsugawa is to deposit nickel only on one side of the copper foil, namely the bonding surface of the copper foil which is in contact with the resin layer. This can be seen in the various examples. In that regard, the Applicants invite the Examiner's attention to example 1 in column 5 beginning at line 45 wherein solutions containing nickel are applied to the matte side (bonding surface) of copper foil. However, as noted above, such deposition is applied to a single side of the copper foil, thereby not solving potential corrosion problems. This is sharply contrasted to the Applicants' Claim 10 wherein the diverters consist of copper foil coated with nickel on both foil surfaces in layer thickness of 10 nm to 3 μm. Thus, the Applicants respectfully submit that even if one skilled in the art were to hypothetically combine the teachings of Nakatsugawa with Takahashi, the result would be an element wherein the terminals would be made from copper foil having a nickel coating on one side. That is not, however, what the Applicants claim. As noted above, the Applicants claim terminals consisting of copper foil coated with nickel on both foil surfaces in layer thicknesses of 10 nm to 3 μm. Thus, that combination is also inapplicable. Withdrawal of that portion of the rejection is respectfully requested.

The Applicants respectfully submit that the combination of Hirai and Nakatsugawa with Takahashi is also inapplicable to new Claim 20. For example, the Applicants respectfully submit that there is no disclosure, no teaching and no suggestion with respect to collectors associated with the negative electrodes consisting of copper and only collectors consisting of copper connected to at least one diverter consisting of copper foil coated with nickel on both surfaces thereof as recited in

that claim. Allowance of Claim 20 is also respectfully requested.

In light of the foregoing, the Applicants respectfully submit that the entire Application is now in condition for allowance, which is respectfully requested.

Respectfully submitted,

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